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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/579,224   | 12/18/2006  | Alberto Del Bianco   | 290652US0X PCT      | 6395             |
| 22850  | 7590        | 09/01/2009           | EXAMINER            |                  |
| OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P.<br>1940 DUKE STREET<br>ALEXANDRIA, VA 22314 |             |                      | MCCAIG, BRIAN A     |                  |
|  |             |                      | ART UNIT            | PAPER NUMBER     |
|  |             |                      | 1797                |                  |
|  |             |                      | NOTIFICATION DATE   | DELIVERY MODE    |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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|                              |                        |                     |  |
|------------------------------|------------------------|---------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b> | <b>Applicant(s)</b> |  |
|                              | 10/579,224             | DEL BIANCO ET AL.   |  |
|                              | <b>Examiner</b>        | <b>Art Unit</b>     |  |
|                              | BRIAN MCCAIIG          | 1797                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 18 December 2006.  
 2a) This action is **FINAL**.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-52 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-17, 21-41 and 48-50 is/are rejected.  
 7) Claim(s) 18-20, 42-47, and 51-52 is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 12 May 2006 is/are: a) accepted or b) objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____ .                                    |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____.   | 6) <input type="checkbox"/> Other: _____ .                        |

#### **DETAILED ACTION**

1. This is the initial Office action based on the 10/579224 application filed December 18, 2006.
2. Claims 1-52 are pending and have been fully considered.

#### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 21 and 48-50 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
5. With respect to claim 21, it is not clear what "at least 600 of the stream containing asphaltenes" refers to in terms of the invention. For continuing examination purposes, the examiner assumes "600" is actually 60%.
6. Claim 48 recites the limitation "the volumetric ratio solvent/flushing stream" in claim 40. There is insufficient antecedent basis for this limitation in the claim. It appears claim 48 should depend on claim 42. For purposes of continuing examination, this is the assumption made by the examiner.

#### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. **Claims 1-17 and 21-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marchionna et al (US 2003/0089636 A1) in view of Garg (US 4486293) and MacArthur et al (US 4874506).**
9. Marchionna et al describes a process similar to that required in steps 5-7 of claim 1 of the instant application. In particular, Marchionna et al discloses mixing a heavy charge comprised of heavy crude oils,

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distillation residues, and heavy oils from catalytic treatment such as heavy cycle oils, thermal tars, and tars from various kinds of coals [paragraph 0041] that inherently contains asphaltenes with hydrogen [paragraph 0046] and a hydrotreating catalyst selected from those obtained from easily decomposable oil-soluble pre-cursors or pre-formed compounds including molybdenum [paragraph 0043] in concentrations ranging from 350 to 10,000 ppm (more preferably, 1,500 to 5,000 ppm) [paragraph 0044] in a hydrotreating reactor operated at a temperature of 370 to 480° C (preferably 380 to 440° C) and a pressure of 3 to 30 MPa (preferably 10 to 20 MPa) to obtain a hydrotreated effluent in which the catalyst is in a dispersed phase [paragraphs 0027 & 0028], which is subsequently sent to a distillation process, which is carried out at a reduced pressure from 0.001 to 0.5 MPa (preferably, 0.05 to 0.3 MPa) [paragraphs 0028 & 0047] to produce a high boiling fraction that is sent to a de-asphalting step to produce two streams: a de-asphalted oil and a steam of asphalt enriched with metals, catalyst in dispersed phase, and coke [paragraph 0029], which corresponds to the asphaltene stream of the instant application. The de-asphalting step is effected by an extraction with a solvent, which may or may not be hydrocarbon, (for example with paraffins having from 3 to 6 carbon atoms), is generally carried out at temperatures ranging from 40 to 200° C. and at a pressure ranging from 0.1 to 7 MPa. It can also consist of one or more sections operating with the same solvent or with different solvents; the solvent can be recovered under supercritical conditions thus allowing further fractionation between asphalt and resins [paragraph 0049].

10. Marchionna et al does not appear to explicitly disclose process steps 1 to 4 of claim 1 of the instant application.

11. However, Garg, which is concerned with a process of catalytic coal hydro-liquefaction, discloses a process wherein a feedstock comprising coal is slurried with a hydrogen-donor solvent, which corresponds to the hydrocarbon matrix of the instant application, that is preferably a liquid fuel product of the coal liquefaction process and may include saturated or unsaturated anthracene or creosote oils [column 3, lines 53-68], both of which comprise aromatic compounds, and a hydrogenation catalyst comprising iron and a metal from either Group VI or Group VIII of the periodic table including molybdenum, tungsten, cobalt, or nickel [column 3, lines 16-24], which may be

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impregnated on the coal or mixed with the solvent [column 3, lines 52-53 and 28-31], to produce a liquefaction product. Example 1 indicates that the solvent comprises 30 wt % of the slurry, which is within the range required in claims 7 and 14. The reaction conditions of the liquefaction process include a temperature range from 398° to 454° C, a hydrogen pressure range from 3.45 to 34.5 MPa (preferably 6.9 to 13.8 MPa) and a residence time of 10 to 120 minutes (preferably, 40 minutes) [column 4, lines 37-38; 35 minutes in example 1], which also overlap the required conditions in claims 7 and 14.

12. The liquefaction product is subsequently passed to a gas-liquid separator [column 4, lines 37-54], which corresponds to the flash separation or distillation required in step 2 of claim 1. In the gas-liquid separator, the gases are separated from the liquid product, which contains solvent, liquefied coal, unconverted coal, and ash. The liquid product is then subjected to filtration or centrifugation to separate solid liquefaction residue containing ash and unconverted coal from the residue-free stream. The former stream containing residue corresponds to the insoluble stream in step 3 of claim 1 in the instant application, and the latter stream corresponds to the liquid stream disclosed therein. The liquid stream is then directed to a distillation step to separate the solvent from the distillable oils and recycle the solvent.

13. Garg does not appear to explicitly disclose the solvent de-ashing process required in step 3 of claim 1. Instead, Garg discloses the aforementioned filtration or centrifugation to separate solid liquefaction residue containing ash and unconverted coal from the residue-free stream. However, MacArthur, which is concerned with a process of direct liquefaction of coal, similar to that of Garg, discloses that centrifugation, filtration, and solvent de-ashing are equivalent solid-liquid separation techniques [column 8, lines 22-30]. Therefore, it would have been obvious to one of ordinary skill in the art to substitute a solvent-deashing process for the centrifugation/filtration process of Garg since the two processes were art-recognized equivalents at the time the invention was made.

14. Furthermore, at the time of the invention it would have been obvious to one of ordinary skill in the art to modify the process of Marchionna et al with the liquefaction and subsequent separation steps of modified Garg since Marchionna et al teaches that the inventive process disclosed therein may be used with heavy oils from coals having

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similar properties as those of Garg (see, e.g., the asphaltene composition of the product of Garg in Tables 4, 6, and 8, which range from 15.2 to 24.3 wt % and compare to the asphaltene content of Marchionna et al (US 5932090) referenced in paragraphs 0025 and 0076 of Marchionna et al '636 as IT-95A001095, wherein the asphaltene concentration of the vacuum residue feed to the hydrotreating process, which is similar to the hydrotreating process of the Marchionna et al '636, is 21.6 wt %, and the hydrotreating processes are the same using the same reaction conditions and catalysts; compare, e.g., column 2, lines 50-53 of Marchionna et al '090 and paragraph 0045 of Marchionna et al '636 for hydrotreating reaction conditions and column 1, lines 43-49 of Marchionna et al '090 and paragraph 0010 of Marchionna et al '636 for the hydrotreating catalysts). Furthermore, it would have been obvious to one of ordinary skill in the art to combine the two processes in order to reduce the concentration of sulfur in the product of Garg since the concentration is too high to be used as a liquid fuel. Therefore, the invention as a whole would have been *prima facie* obvious at the time the invention was made.

15. With respect to claim 6, Garg discloses that the non-distillable material from the centrifuge/filtration (or, equivalently, the de-ashing unit) containing ash and unconverted coal is processed and recycled to the liquefaction process to comprise part of the hydrocarbon matrix [column 4, line 54 to column 5, line 2].

16. With respect to claims 8-10 and 13, while Garg does not appear to explicitly disclose the required recycle streams, it would have been obvious to one of ordinary skill in the art to recycle the required streams since the components of those streams have hydrogen donor and transfer capabilities, which Garg teaches is a useful solvent [column 3, lines 52-68].

17. With respect to claims 11 and 12, Garg discloses that the solvent is recovered from the distillation process corresponding to the distillation step (RS) of the instant application and recycled to the liquefaction unit [column 4, lines 52-53] as well as separation of distillate oils, wherein the plurality of oils renders obvious the further distillate stream of claim 12 of the instant application.

18. With respect to claims 21-23, Marchionna et al discloses that at least 60% and, more preferably, at least 80% of the stream comprising asphaltenes, catalyst in dispersed phase, coke, and metals, is recycled to the

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hydrotreatment zone. Furthermore, the liquefied coal is considered to be the raw feed to the hydrotreatment zone as discussed previously.

19. With respect to claims 24 and 25, Marchionna et al discloses that a portion of the distillation residue is sent to the de-asphalting zone, SDA in figure 1, via reference element 13, and a portion is sent to the hydrotreatment zone, HT in figure 1, via reference element 15 [paragraph 0080]. Marchionna et al also discloses part of the feed to the hydrotreatment zone coming from the deasphalting section via reference element 3.

20. With respect to claims 26-28, Marchionna et al discloses that the ratio of the heavy residue from the distillation process to the hydrotreatment zone to the heavy residue to the SDA ranges from 0 to 100 and is preferably from 0.1 to 10 [paragraph 0052], which covers the required percentages in the instant claims.

#### ***Allowable Subject Matter***

21. Claims 18-20 and 42-52 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims (and to overcome the 112, second paragraph, issues relative to claims 48-50).

22. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not appear to disclose or render obvious the separation pre-step subsequent to the hydrotreatment zone in claims 18-20, the treatment of the flushing stream in claims 42-50, or the recovery and recycling of the hydrogenation catalyst to the hydrotreatment zone in claims 51 and 52. With respect to the limitations of claims 18-20, the closest reference appears to be Montanari et al (US 2006/0157385 A1 or WO2006/066911), which discloses the process of the aforementioned claims in a context similar to that Marchionna et al. However, the reference does not constitute prior art. Similarly, Montanari et al (US 2006/0163115 or WO2004/056946 A2) discloses a process similar to the treatment of the flushing stream as required in claims 42-50 of the instant application in a context similar to the process of Marchionna et al. However, this reference does not constitute prior art either. Therefore, there does not

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appear to be references constituting prior art which anticipate or render obvious the limitation required in above referenced claims.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRIAN MCCAIIG whose telephone number is (571) 270-5548. The examiner can normally be reached on M-F 8-430.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Calderola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BAM  
8/24/2009

/ROBERT J. HILL, JR/  
Primary Examiner, Art Unit 1797